

# Pharmacology

Drugs that Affect the  
Gastrointestinal System

## Topics

- Peptic Ulcer Disease
- Constipation
- Diarrhea
- Emesis
- Digestion

# Peptic Ulcer Disease

Factors that Increase Acidity

Factors that Protect Against Acidity

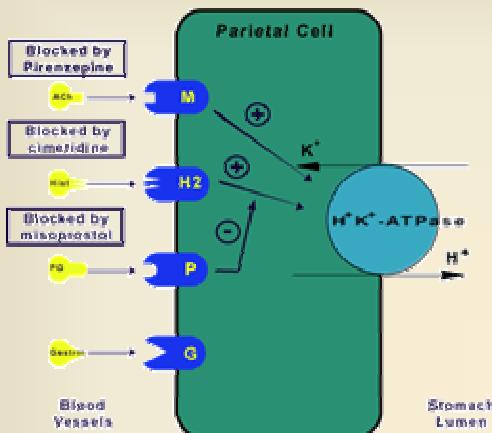


# Peptic Ulcer Disease

- Factors Increasing
  - *H. pylori*
  - NSAIDs
  - Acidic agents
  - Pepsin
  - Smoking

- Factors Decreasing
  - Mucus production
  - Buffers
  - Blood flow
  - Prostaglandins

# Regulation of Gastric Acid Secretion



## H<sub>2</sub> Receptor Antagonists

- Inhibits gastric acid secretion
- No effect on H<sub>1</sub> receptors
- cimetidine (Tagamet®)
- ranitidine (Zantac®)
- famotidine (Pepcid®)
- nizatidine (Axid®)

## H<sub>2</sub> Receptor Antagonists

- Indications:
  - PUD
  - GERD
  - Prevention of aspiration pneumonia

## Proton Pump Inhibitors

- K<sup>+</sup>H<sup>+</sup>ATPase (Proton Pump)
- Irreversible inhibition
  - Must synthesize new enzyme
  - Long duration
- omeprazole (Prilosec®)
- lansoprazole (Prevacid®)

## Anticholinergics

- pirenzepine (Gastrozepine®)
- Other anticholinergics have too many side effects and are not used

## Prostaglandin Analog

- misoprostol (Cytotec®)
  - Approved for treating PUD due to long term NSAID use

## Antacids

- Increase pH of gastric environment
- Hydroxides
  - Aluminum
  - Magnesium
- Carbonates
  - Calcium

## Antacids

- Most OTC drugs are combinations
  - DiGel®
  - Amphojel®
  - Maalox®
  - Milk of Magnesia®
  - Mylanta®

## Antibiotics

- Aimed at eliminating *H. pylori*
- bismuth (Pepto-Bismol®)
- metronidazole (Flagyl®)
- amoxicillin (Amoxil®)
- tetracycline (Achromycin V®)

## Stool Formation

Water absorbed in colon (~90%)

- Excessive absorption
  - Constipation: hard, dehydrated stool
  - Increases strain on defecation
  - Harmful for subset of patients
    - Recent episiotomy, colostomy, hemorrhoids, cardiovascular disease
- Inadequate absorption
  - Diarrhea: soft, non-formed, liquid stool

## Terms

Laxative

Production of soft, formed stool over 1 or more days

Cathartic

Rapid, intense fluid evacuation of bowel.

## Laxatives

- Bulk forming
- Surfactants
- Stimulants
- Osmotics

## Bulk Forming Laxatives

- Absorb water
- Soften and enlarge stool
- Fecal swelling promotes peristalsis

- methylcellulose (Citrucel®)
- psyllium (Metamucil®)
- Polycarbophil

## Surfanctant Laxatives

- Lowers surface tension
  - Facilitates water penetration

- Docusate salts
  - Colace®
  - Modane Soft®)

## Stimulant Laxatives

- Stimulate peristalsis
  - Increases water and electrolytes secretion into intestinal lumen
  - Decreases water and electrolyte reabsorption
- Phenylolphthalein
    - (Ex-Lax®, Feen-a-Mint®, Correctol®)
  - bisacodyl (Ducolax®)

## Osmotic Laxatives

- Poorly absorbed salts remain in fecal matter
  - Pull water into lumen
- Magnesium hydroxide (Milk of Magnesia®)

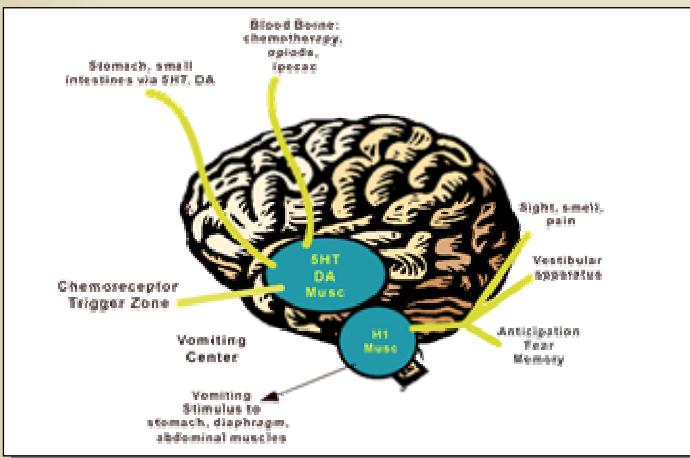
## Antidiarrheal

- Diarrhea is usually a compensatory action...
  - Treatment aimed at cause, no symptom
- Opioid receptors in GI tract decrease motility
  - Increase time for water reabsorption

## Antidiarrheal Agents

- paregoric/opium tincture
- diphenoxylate (Lomotil®)
- defenoxin (Motofen®)
- loperamide (Imodium®)

# Vomiting Stimulus



# Antiemetics

- Serotonin (5HT) Antagonists
- Dopamine (DA) Antagonists
- Anticholinergics (muscarinic blockers)
- Cannabinoids

## Serotonin Antagonists

- Used to treat side effects of chemotherapy-induced emesis
- ondansetron (Zofran®)
- Doesn't affect dopamine receptors
  - ∴ no extrapyramidal effects
- Granisetron (Kytril®)

## Dopamine Antagonists

- Phenothiazines
  - prochlorperazine (Compazine®)
  - promethazine (Phenergan®)
- Butyrophenones
  - haloperidol (Haldol®)
  - droperidol (Inapsine®)
- metoclopramide (Reglan®)

## Cannabinoids

- Tetrahydrocannabinol (THC)
  - Active ingredient in marijuana
  - Dronabinol (Marinol®)
  - Nabilone (Cesamet®)

## Digestion Aids

- Useful for inactive vagal stimulus/bypassed duodenum
- Pancreatin (Entozyme®)
- Pancrelipase (Viokase®)